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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,767	01/24/2006	Yuichiro Shindo	OGOSH43USA	2990
270 7590 05/21/2010 HOWSON & HOWSON LLP 501 OFFICE CENTER DRIVE SUITE 210 FORT WASHINGTON, PA 19034			EXAMINER SHEVIN, MARK L	
			ART UNIT 1793	PAPER NUMBER
			NOTIFICATION DATE 05/21/2010	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@howsonandhowson.com

Office Action Summary	Application No. 10/565,767	Applicant(s) SHINDO, YUICHIRO	
	Examiner MARK L. SHEVIN	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04/20/2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,27,28 and 30-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,27,28 and 30-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/20/2010</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgement of RCE

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 20th, 2010 has been entered.

Status of Claims

2. Claims 1, 27, 28, and 30-33, filed December 23rd, 2008 are pending. No claims have been changed since the last Office action mailed November 20th, 2009.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted April 20th, 2010 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner. Please refer to applicants' copy of the 1449 form submitted herewith.

Status of Previous Rejections

4. The previous rejections of claims 1, 27-28, and 30-30 over **Shindo** (US 2003/0062261 A1) under 35 U.S.C. 103(a) in the Office action dated November 20th, 2009 have been maintained.

5. The previous rejections of claims 1, 27-28, and 30-30 over **Murray** (G.T. Murray and T.A. Lograsso ...) in view of **Shindo** under 35 U.S.C. 103(a) in the Office action

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dated November 20th, 2009 have been withdrawn and new rejections based solely on Murray instituted.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103(a)

6. Claims 1, 27-28, and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shindo** (US 2003/0062261 A1).

Shindo is drawn to high purity zirconium or hafnium with minimal impurities (Abstract). Shindo discloses in Example 2, beginning at para 0120 a high-purity hafnium sputtering target (claim 4 and Title) with 4N (99.99%) purity level excluding gas components such as carbon, oxygen, and nitrogen (para 0133). Oxygen and carbon are present at less than 500 ppm (claim 6). Table 4 at para 0089 discloses hafnium with a carbon content of 30 ppm, nitrogen less than 10 ppm, and oxygen at 100 ppm. (Table 4 at para 0089). Fe, Cr, and Ni are present at less than 10 ppm (Table 4 at para 0089 and Table 4 at para 0131).

Shindo thus teaches a sputtering target or thin formed therefrom made of a high-purity hafnium material with a 4N purity level excluding gas components of carbon, oxygen, and nitrogen. Examples of hafnium are taught with impurities within the claimed ranges and Shindo further teaches that the zirconium content of the high-purity hafnium material should be 0.5 wt% (5000 wt ppm) or less (claim 1). The disclosed zirconium content thus overlaps the range claimed in claim 1 of the instant application and

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establishes a *prima facie* case of obviousness with Shindo (See MPEP 2144.05, para I: In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists).

Thus it would have been obvious to one of ordinary skill in the metallurgical arts at the time the invention was made, to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

7. **Claims 1, 27-28, and 30-33** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Murray** (G.T. Murray and T.A. Lograsso, Preparation and Characterization of Pure Metals, *ASM Handbook*, Vol. 2, (1995), p. 1093-1097).

Murray:

Murray discloses (p. 1094, col. 3) that if a low-iron starting metal is used, chemical vapor deposition will produce a condensed vapor with a purity level of 99.999% (5N) and hafnium is one of the metals that have purified by chemical vapor deposition. Murray teaches that if the proper temperature is maintained during the chemical vapor deposition process, oxygen, nitrogen, hydrogen, carbon, as well as many metallic impurities will not be carried over. Murray does not teach the contents of C, O, N, Fe, Cr, and Ni.

Regarding claims 1, 27-28, and 30-33, Murray discloses a method for making a very pure Hf material (and thus implicitly teaches a very pure hafnium material as a

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result) with an overlapping purity of up to 99.999% (5N), which means an overlapping Zr content of not more than 10 ppm as purity is assumed to mean the Hf content by weight percent in a given sample compared to all other elements in the absence of evidence to the contrary. Murray further disclosed that if the proper temperature is maintained, O, N, H, C, and other typical metal impurities would not be carried over.

The Examiner notes that the purity of the hafnium disclosed by Murray overlaps the purity of the instant invention, which is prima facie evidence of obviousness (see MPEP 2144.05 I). Thus it would have been obvious to one of ordinary skill in the metallurgical arts at the time the invention was made, to choose the instantly claimed ranges through process optimization, for the same reasons as stated in the rejections in section 4 above, see MPEP 2144.05.

With respect to the recitation "A sputtering target or thin film formed therefrom comprising a sputtering target or thin film made of a high purity hafnium material...", the Examiner notes that although Murray does not specify the size or shape of the hafnium metal, "a sputtering target or thin film" is not defined to exclude any specific size or shape of metal. Furthermore, changing the size/proportion of the hafnium metal would not patentably distinguish over the prior art, (see MPEP 2144.04 IV).

Response to Applicant's Arguments:

8. Applicant's arguments filed April 20th, 2010 have been fully considered but they are not persuasive.

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Applicants assert (p. 4, para 2) that one of ordinary skill in the art would determine the lower limit of Zr of Shindo to be around 2400 wt ppm, which does not overlap the claimed Zr range of 1 wt ppm to 1000 wt ppm Zr. In response, Applicants have not produced evidence of secondary considerations to rebut the prima facie case of obviousness based on overlapping ranges.

Applicants assert (p. 4, para 3) that the purification method of Shindo only features nitric acid cleaning and electron beam melting which are extremely difficult to use to separate out Zr from Hf and are “ineffective for reducing the Zr content which exists in Hf material in a quantity exceeding 1000 wt ppm.” In response, the instant claims are drawn to products and must be patentably distinct based on their structural limitation, not the method of production. Applicants had previously asserted (1.132 declaration filed July 31st, 2009) that Shindo would not make a Hf material with a Zr content of less than 1000 wt ppm because of the limitations of the production method disclosed but failed to provide factual evidence to support these assertions. Applicants had further asserted additional testing attempting to show that the process of Shindo did not change the Zr content in Hf (p. 1, para 7 and p. 2, para 1 of 1.132 declaration filed July 31st, 2009) however this testing was unpersuasive as the testing was directed towards purifying Hf raw material with Zr contents already in the claimed range (starting materials of 600, 700 ppm Zr - p. 1, para 7).

Applicants assert (p. 5, para 4-5) that Shindo does not recognize the Zr content as being a problem and that it may be disregarded which proves that the instant claims' reduced Zr content is unexpected and critical to the stability of electronic components.

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In response, per MPEP 716.02(d): "To establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. *In re Hill*, 284 F.2d 955, 128 USPQ 197 (CCPA 1960). Applicants have provided no such tests and moreover no direct, quantitative comparisons showing an unexpected increase in stability of electronic components only when Zr is in the claimed range of 1 – 1000 wt ppm.

Applicants assert (p. 5, para 5) that it is error to conclude that the cited reference teaches 0 wt% Zr. In response, the instant rejections do not assert that Shindo discloses 0 wt% Zr, but rather than Shindo discloses an overlapping range of Zr (0.5 wt% and below).

Applicants assert (p. 6-8) that Murray does not provide any analytical data concerning the impurities contained in hafnium and that the Examiner's assertion that Murray's material possesses an overlapping range of Zr is incorrect. Applicants additionally argue that the reference (Ref. 5) referred to by Murray provides actual data relative to hafnium, and the purity content is well outside the scope of the claimed products. Applicants conclude that the hafnium material is not of 4N5 (99.995%) purity as required by the instant claims. In response, the Examiner notes that according to Murray, to achieve a purity level of 99.999%, the starting metal must have a purity of about 99.9% and be a low-iron starting metal (p. 1094, col. 3). Since none of the hafnium final products disclosed in Rolsten (Iodide Metal and Metal Iodides...) have a purity of greater than 99.22%, it is clear that the starting metal did not have a purity of 99.9% (since 99.9% is of higher purity than 99.22%). However, it would also be

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expected that if one skilled in the art applied 99.9% purity hafnium metal having low iron as a starting material then a final product having a purity level of 99.999% hafnium could be achieved by chemical vapor deposition (CVD) according to Murray (p. 1094, col. 2-3). Therefore, Applicants arguments are not persuasive.

Conclusion

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793

10-565,767
May 13th, 2010

/George Wyszomierski/
Primary Examiner
Art Unit 1793